The Bulletins are published weekly throughout the school year (thirty issues) to aid teachers and students in keeping abreast of geography behind current news events.

GEOGRAPHIC SCHOOL BULLETINS

of

The National Geographic Society

WASHINGTON 6, D. C.

The National Geographic Society is a non-profit educational and scientific society established for the increase of geographic knowledge and its popular diffusion.

VOLUME XXXI — November 17, 1952 — NUMBER 7

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A PENGUIN COCKS A WHITE-RINGED EYE AND RAISES A WING AS THOUGH TO TAKE TO THE AIR

The white ring around its eye distinguishes the Adélie penguin from the other three species of the bird which romp about on Antarctic ice fields (Bulletin No. 3). Although the penguin can swim like a fish, to which it is no kin, it cannot fly—like the bird it actually is. It waddles and leaps about, flapping its inadequate wings, but "getting nowhere fast."

Bulletin No. 1, November 17, 1952

Near-East Pipe Line Crosses Historic Ground

SCHEDULED to be completed this fall, a pipe line from the oil fields at Kirkuk, Iraq (ancient Mesopotamia), to Baniyas, on Syria's Mediterranean coast, has already been in operation for six months.

This unusually swift construction was achieved by teams of Americans, Britons, Syrians, and Iraqis. Beginning in November, 1950, they laid down 160,000 tons of welded steel pipe made in the United States. It is expected to carry 14,000,000 tons of crude oil annually from Iraqi oil fields to Mediterranean tankers.

Crusader Castle Crowns Near-by Hill

The line of 30-inch pipe traverses 556 miles of rugged hills and narrow valleys, sandy desert reaches, and lands where irrigation makes possible crops of peaches, apricots, and numerous other fruits, as well as grain. It is a land with a history stretching back to Bible times and beyond.

Camouflaged on a hilltop, five miles from Baniyas, stands the Crusader castle of el Merkab. This venerable structure once housed 2,000 families and stabled 1,000 horses.

In Tartus, 35 miles to the south, the graceful vaulted arches and carved pillars of a fine old Crusader church tower above a dusty emptiness. Along this historic coast a medieval church seems almost as modern as the tankers which suck Iraqi oil into their cavernous holds.

Seventy miles to the west, across the eastern Mediterranean, lies the island of Cyprus. Ever since the days of the Greeks and the Phoenicians, who had colonies there, Cyprus has been fought over because of its strategic position. Turkey ceded it to Britain in 1878, and for the past 27 years it has been a British Crown Colony.

Roman Ruins Mark the Landscape

In its flow from east of the Tigris and Euphrates, the liquid fuel for modern industry passes the whitened skeletons of Palmyra, whose Queen Zenobia defied imperial Rome.

Modern air travelers, flying over old, vanished caravan trails, can see traces of Roman forts and walls, built soon after Christ's crucifixion, which held off marauders from the hills of Kurdistan, to the northwest, where Turkey, Iran, and Iraq meet.

Near Homs, where the Roman emperor, Aurelian, humbled Zenobia before taking her to Rome to grace his triumph, the 30-inch pipe line crosses the Orontes River.

As miles of pipe were laid each day, workers skirted the low ends of the Lebanon and Anti-Lebanon ranges. To students of ancient history, this area is more important than Gettysburg or Kwajalein. There was fought the battle of Kadesh, where the Egyptian gods saved Rameses from the Hittite chariots and so made him "the Great."

ENTERED AS SECOND CLASS MATTER APRIL 27, 1943, POST OFFICE, WASHINGTON, D. C., UNDER ACT OF MARCH 3, 1879.
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AIRCRAFT OPERATING COMPANY

MOUNTAINS OF POSSIBLE MINERAL WEALTH RISE ON THE RAND BEYOND JOHANNESBURG'S MODERN TOWERS OF COMMERCE

From the barren pyramids of gold tailings that form a backdrop for Johannesburg may come new fortunes in uranium, chief source of atomic power. In half a century Johannesburg rose from a hamlet of mining shacks on a gold-lined ridge to become the largest city in Africa except Cairo. Tall modern buildings, tree-lined avenues, and beautiful residential suburbs now cover nearly 100 square miles of land that was barren veld before gold was discovered 66 years ago.

Bulletin No. 2, November 17, 1952

Transvaal Gold Waste May Supply Uranium

THE opening of a plant for extracting uranium oxide from gold tailings begins a new era for South Africa's gold-mining industry.

It is situated near Krugersdorp, in the Union of South Africa's Transvaal Province, a few miles west of Johannesburg (map, next page).

The new plant is the first to be completed of a half dozen under construction along the Witwatersrand. If the project proves profitable, other plants will be built along the fabulous ridge that ranks as the world's greatest producer of gold.

Project Adds to Drama of "the Rand"

In the decades since 1886 when gold was discovered on "the Rand," hundreds of millions of tons of waste from the mines have piled up into barren hills in the vicinity of Johannesburg (illustration, inside cover) and for many miles beyond. Stretching across the plain, they suggest a line of Egyptian pyramids or massive fortifications built by some primitive race.

A process has been developed by which uranium, chief source of atomic energy, can be extracted from the mine tailings at what is estimated to be a reasonable cost. The project brings new activities and significance to an already teeming industrial center. It also adds another dramatic chapter to the Cinderella story of a region that less than three-quarters of a century ago was lonely space.

Before the discovery of gold there were scarcely 50 inhabitants in the district which today supports more than a third of South Africa's white population. Most of the original 50 were scattered farmers and stock raisers, as unconscious of the wealth under the pastures where their herds grazed as had been the earlier Boer Trekkers who named the area Witwatersrand, "Ridge of the White Waters."

The boisterous gold rush that struck the ridge region on the opening of the land to prospectors was like the '49 fever that started the settlement of California.

"Jo'burg" Population Nears a Million

On the high inland plateau near the gold diggings, the modern metropolis of Johannesburg was born. First a mining village of tents and covered wagons, then a raw tin-roofed town of 3,000 people, it was destined to become the industrial and commercial hub of the Union of South Africa. By 1950, its estimated population was 864,900, of whom 349,900 were of European extraction, 470,700 of African. The total figure includes 27,000 Eurafricans and 17,300 Asiatics.

Along the Rand east and west of "Jo'burg," a dozen thriving towns and cities have grown up. They serve as marketing and industrial centers for a region in which roughly 40 per cent of South Africa's manufacturing is concentrated.

Between 40 and 50 gold mines are now in operation along the 70-mile stretch of the Rand, or "the Reef," as the Witwatersrand is also

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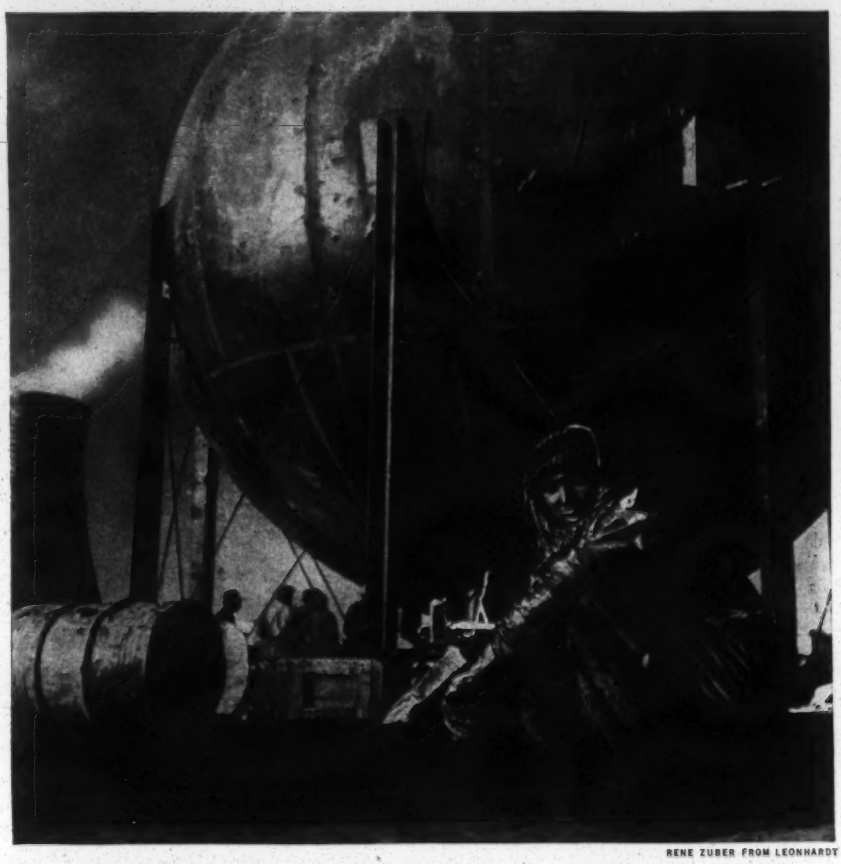
Thus a modern pipe line links historic events which date back to the first sail. Warring forces from the Egyptian desert and the Hittite hills were among the many who fought for power at this meeting place of three continents—Asia, Europe, and Africa.

NOTE: Kirkuk and Baniyas may be located on the National Geographic Society's map of Bible Lands and the Cradle of Western Civilization. Write the Society's headquarters, Washington 6, D. C., for a price list of maps.

For additional information, see "Ancient Mesopotamia: a Light That Did Not Fail," in *The National Geographic Magazine* for January, 1951; "Home to the Holy Land," December, 1950; "An Archeologist Looks at Palestine" and "Arab Land Beyond the Jordan," December, 1947: "Syria and Lebanon Taste Freedom," December, 1946; "Palestine Today," October, 1946; and "American Fighters Visit Bible Lands" and "Mountain Tribes of Iran and Iraq," March, 1946. *(Back issues of the Magazine may be obtained from the Society's headquarters at 60¢ a copy, 1946 to date; $1.00, 1930–1945; $2.00, 1913–1929. Earlier issues at varied prices.)*

See also, in the GEOGRAPHIC SCHOOL BULLETINS, November 19, 1951, "Land and Water Problems Vex Israeli and Arab"; and "Iraq's Past Is a Blueprint for Its Future," December 18, 1950.



RENE ZUBER FROM LEONHARDT

OILY DUNGAREES COULD PLACE HIM IN OKLAHOMA, BUT HEADDRESS LABELS HIM IRAQI

At Kirkuk's fields oil is stored in spherical tanks which reduce evaporation caused by the intense summer heat of the northern Iraq town. The nation's oil fields were developed by American and British engineers and mechanics but natives now perform most of the routine work.

Bulletin No. 3, November 17, 1952

Explorers Prove There Is No Antarctic Ocean

IS there an Antarctic Ocean? This question is often asked, and the answer is: No. One word, however, is hardly enough to make the matter understandable.

One of the traditional "seven seas" (along with the North and South Atlantic, the North and South Pacific, the Indian, and Arctic oceans), the Antarctic as an ocean has been put off the map by south polar exploration of the 20th century.

The most important single factor in defining an ocean is the existence of a distinct basin. The earth's three main oceans—Atlantic, Pacific, and Indian—and the Arctic Ocean, too, have well defined basins. The Antarctic has none.

Nearly as Large as South America

Decades ago, when the size of the land mass at the South Pole was unknown, maps commonly showed an Antarctic, or Southern, Ocean. Its northern limit was often a line connecting the southern tips of South America, South Africa, Australia, and New Zealand.

The basin of this "ocean" was thought to be centered under the polar ice. Now, however, Antarctica, beneath its ice cap, is known to be a continent covering nearly 6,000,000 square miles. It is almost as large as South America, with the highest average elevation of any continent.

Geographically, therefore, seas lapping Antarctica's coasts are merely southern reaches of the Pacific, Atlantic, and Indian oceans, and up-to-date maps show no Antarctic Ocean.

Scientists studying drift ice, temperatures, currents, and all forms of life in the oceans often find it convenient to refer to the Antarctic ocean, meaning the waters of the Antarctic region. They agree, however, that these waters do not make a geographically distinct ocean.

Antarctica is a vast wilderness of rugged mountains, deep crevasses, seemingly endless glaciers, and mile upon mile of gleaming snow fields. One of its mountain peaks towers 20,000 feet.

Could Serve as Airport

Animal life is scanty and unusual. Weddell seals, the world's southernmost mammals, live in ice grottoes; killer whales abound in offshore waters, and seals and penguins (illustration, cover) sun themselves on rocky cliffs. Vicious skua gulls devour penguin eggs and young penguins, and attack almost anything they can eat.

In spite of its limitless frozen wastes, Antarctica is coveted for a number of reasons. Explorers familiar with the remote southern continent hold that it possesses vast stores of valuable minerals, including coal and oil. For some time it has been useful for whaling and sealing. Its possible use as an airport for global air transport gives it value in the belief of twelve nations which frequently press their claims to sections of the frigid region.

In this land of everlasting ice, explorers have discovered at least two areas of bare land ridged with barren, rocky hills between which

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known locally. Among them are the world's deepest working bores. Like skyscrapers in reverse, these reach 9,000 feet below the surface. Some years ago a writer figured the tonnage of the mines' dumps as roughly equal to that of 102 Great Pyramids. Recent estimates put it at about one billion tons of refuse.

Modern machinery, air conditioning, health protection, and facilities for many kinds of recreation, including native dancing, are features of the mine administration that affect the lives of some 350,000 employees.

NOTE: The Witwatersrand may be located on the Society's map of Africa.

For additional information, see "British Commonwealth of Nations," in *The National Geographic Magazine* for April, 1943; "Cities That Gold and Diamonds Built," December, 1942 (out of print; refer to your library); and "Under the South African Union," April, 1931.

DRAWN BY H. E. EASTWOOD AND D. G. BOUMA

FABULOUS MINERAL RICHES STILL LIE HIDDEN IN THE TRANSVAAL'S GOLDEN RIDGE

North of the Vaal River, source of the province's name, rises the Witwatersrand which brought wealth, cities, and fame to the South African Union's northeastern bulge. In the 66 years since gold was discovered there, Rand mines have turned out approximately 1,200,000,000 tons of ore.

Bulletin No. 4, November 17, 1952

Sequoia Stakes out Second Home in Hawaii

CALIFORNIA'S coastal redwoods—*Sequoia sempervirens*—have at last established themselves beyond the continental limits of the United States. Representatives of the largest and oldest trees in the world now flourish in the fertile soil of Hawaii, name island of the Pacific archipelago.

Across more than 2,000 miles of ocean these forest giants, transplanted as yearlings from their native California, are reaching logging size among the volcanic mountains and tropical vegetation of Hawaii.

Modern Forestry Extends Redwood Areas

Since the Glacial Age, the coastal redwoods have been native only to the coast of California and southern Oregon. They and the "Big Trees" (*Sequoia gigantea*) of the Sierra Mountains, and the dawn redwoods of China are the three known survivors of a family that once grew over the entire Northern Hemisphere. Like their contemporaries, the dinosaurs, these trees have left huge fossils buried in many countries.

Now, under modern forestry methods, the redwoods are beginning to spread out again over their old range of growth and even to extend it to new territories, as in the case of the redwood nursery on Hawaii.

Twenty-five years ago a thousand Sequoia yearlings were transplanted from California to Hawaii. They have flourished in their adopted land and some of them have already attained a size suitable for cutting. The first tree felled was 88 feet tall and had a diameter of 14 inches. This is small for a species which has been known to achieve a 20-foot diameter and a height of 364 feet.

Sequoia sempervirens combines majestic beauty with commercial value. The lumber is especially useful in tropical countries where dampness and a great variety of insects cause widespread decay. The redwood lumber is resistant to decay and appears to be distasteful to the termites which devour so much of the wood in the tropics. It also shrinks far less than any other wood commonly used.

Seeds Given to United Nations

The handsome, ruddy color of the redwood comes from complex chemicals, some found nowhere else in nature. They penetrate every cell of the wood, making it durable—and unpalatable to insects.

Seeds from California's General Sherman tree, one of the oldest and largest of Sequoia gigantea, were sent to the fifty United Nations delegates attending the San Francisco Conference in 1945. Giant sequoia seeds have been planted in the Himalaya region to increase India's forest wealth. Seedlings of the dawn sequoia, germinated at the University of California, are growing again in Alaska for the first time in about 35 million years. In South Africa redwoods have been planted to serve as shade trees.

Many Sequoias are flourishing in the eastern part of the United States, as far north as Pennsylvania.

When logging threatened to destroy the Sequoias, a group formed the

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gleam the blue and green waters of unfrozen lakes. One of these lakes is large enough to serve as a seaplane landing. These "oases" may indicate a gradual melting of the ice which might eventually clear much of the continent.

Antarctica lies midway between Australia and South America. The Australian city of Sydney is almost as close to Buenos Aires, Argentina, as the South American metropolis is to London, in Europe.

Considering the tremendous speed of modern jet planes, it is easy to imagine an airport on Antarctica becoming the Gander (Newfoundland) of the Southern Hemisphere.

NOTE: Antarctica is shown on the Society's World Map, on which it appears as a large-scale inset.

See also, "Our Navy Explores Antarctica," in *The National Geographic Magazine* for October, 1947; "My Four Antarctic Expeditions," July, 1939; "My Flight Across the Antarctic," July, 1936; and "Exploring the Ice Age in Antarctica," October, 1935.

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GEOLOGISTS STUDYING ANTARCTICA CAMP AT THE FOOT OF THE QUEEN MAUD MOUNTAINS WHOSE BLACK CLIFFS BREAK SHARPLY THROUGH THE PERPETUAL SNOW, ONLY 270 MILES FROM THE POLE

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Bulletin No. 5, November 17, 1952

Macau Is Far East's Oldest Western Outpost

MACAU, Portugal's teeming port on the south China coast and scene of skirmishing between Chinese communist troops and the colony's small garrison, is the oldest of Europe's outposts in the Far East.

It was the first haven in all the China seas where Western mariners were allowed to trade with the suspicious Orient.

In their golden era of glory as discoverers of strange foreign lands, Portuguese navigators sailed far beyond the Cape of Good Hope passage which Vasco da Gama had blazed to India. At the mouth of the Canton River they came upon the peninsula of Macau (Macao), dangling like a pendant from the island of Chung-Shan into the South China Sea. They landed at a spot about 35 miles from where the British Crown Colony of Hong Kong was later founded.

Has Been a Haven to Many Refugees

The Portuguese settled upon approximately three square miles of the peninsula about 1557. The red, green, and gold banner of Portugal was raised on its heights and has waved there ever since.

Sometimes the Portuguese have had to fight to hold their rich China trading post, as when the Dutch five times attacked it in the 17th century. But for most of the 400 years of their occupation they have been able to maintain neutrality. Macau has been a refuge for countless thousands fleeing from war and persecution. When the Japanese invaded China in 1937 people from all over the country poured into Macau. Orphanages in the colony gave homes to thousands of destitute Chinese children.

Perhaps most famous of refugees to whom Macau has given asylum was Luis de Camoens, Portugal's expatriate poet. Camoens is believed to have written part of his great epic poem, *Os Lusiadas*, beneath Macau's banyans and fragrant frangipani trees.

The 1950 census reported the population of the colony as 187,772, fewer than 3,000 being Europeans, and the vast majority Chinese. During the past two years great hordes of refugees have flocked in from communist China and settled down in all manner of makeshift huts. This migration has raised the population figure to something over 300,000.

Built First Lighthouse on China Sea

Thousands of high-sterned junks, their patched and faded sails of blue or cocoa-brown varied by an occasional old-style one of straw matting, crowd the harbor. In addition to fish, Macau's major exports are matches, firecrackers, incense, and textiles. Until May, 1952, when an American embargo barred exports from communist China, the United States was Macau's chief customer. Although a Portuguese colony, Macau in this instance is treated as though it were a Chinese port by the United States government.

As good sailors, and as trustees for the Western trade, the Portuguese built the Guia beacon on Macau in 1864. This was the first to light

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Save-the-Redwoods League. This organization has saved thousands of acres of sequoias at a cost of several million dollars. Huge tracts have been incorporated into state and national parks.

Members of the National Geographic Society contributed $100,000 toward the purchase of a grove of Sequoia gigantea known as the Giant Forest which is now part of Sequoia National Park.

NOTE: Areas where sequoias grow may be located on the Society's map of the Southwestern United States. The Hawaiian Islands are shown in a large-scale inset on the map of the Pacific Ocean and the Bay of Bengal.

For additional information, see "Saving the Earth's Oldest Living Things," in *The National Geographic Magazine* for May, 1951; "California's Coastal Redwood Realm," February, 1939; and "Among the Big Trees of California," August, 1934 (out of print; refer to your library).

See also, in the GEOGRAPHIC SCHOOL BULLETINS, October 23, 1950, "Proper 'Farming' to Assure Sequoia's Future."

FRESNO BEE

AT THE AGE OF 2,000, THIS ANCIENT GIANT WILL TAKE UP A NEW CAREER

Though brittle and soft compared to its cousin, the coastal redwood, this Sequoia gigantea will make fine, durable vineyard stakes. The cream-colored border is sapwood, which holds the tree's life-blood. Marks of the saw which brought it to earth are more noticeable than the rings which reveal that it was probably a sapling before Christ was born.

the China Sea. A modern lamp has replaced the original, but the old lighthouse itself still rises on the wooded hilltop besides the tiny chapel and the fort dating from 1626.

Even while sending their own Jesuit missionaries into the Orient, the Portuguese gave haven to Robert Morrison, the Protestant missionary. Morrison translated the New Testament into Chinese and his six-volume Chinese-English dictionary made it possible for Western scholars to read Chinese literature.

The Portuguese allowed the English to build a cemetery on Macau. There Robert Morrison and his wife were buried, and there, also, lie American clipper-ship sailors and British seafarers with their "hearts of oak" who died in the strenuous China trade.

Macau has charming homes painted the pastel pinks, blues, and yellows reminiscent of Mediterranean architecture. It has tall modern hotels and a fine electric plant. A broad boulevard, the Praia Grande, extends around the crescent of the outer harbor. Vivid tropical trees shade the impressive government buildings that follow the curving shore line.

Travelers who visit Macau today sense an uncertainty as to the future in the tiny colony hanging between communist China and the sea. Current events give an edge of accuracy to Camoens' description of Macau as a "land of sweet sadness."

NOTE: Macau is shown on the Society's map of The Far East.

For further information, see "Macao, 'Land of Sweet Sadness'," in *The National Geographic Magazine* for September, 1933 (out of print; refer to your library).

W. ROBERT MOORE

ON MACAU'S WATER FRONT, CHINESE WOMEN SORT HEAPS OF FISH INTO WAITING BASKETS

The myriad fish that swim the China seas provide a living for some 20,000 of Macau's population—most of them Chinese. Catching and processing fish is the chief industry of the Portuguese colony which has maintained a toehold on the south China coast through four centuries of wars and embargoes.